ABSTRACT:

Due to its attractive characteristics, thin wall ductile iron (TWDI), has been increasingly considered as a preference for reducing material consumption in order to save energy and contribute less environment pollutions as well as decreasing costs. In this research, the effect of two mould runner gating systems and mould coating on graphite nodule characteristics and hardness value of TWDI casting was studied. Strip samples with various thicknesses of 2.3, 3.3, 4.5, 5.4, 6.5, 7.5 and 8.5 mm were cast into CO2 silicate mould designed with two different stepped and tapered runners. Half of the moulds were coated by graphite-based zircon material to investigate the effect of mould coating on the graphite nodule qualities and quantities. Optical microscope and image analyzer were used to evaluate graphite nodule count, roundness and diameter of the TWDI cast samples. Hardness value of all the samples was measured by Brinell hardness testing. The results showed that roundness and count of graphite nodules decreased in microstructure of the samples produced by stepped runner uncoated mould, whilst diameter of graphite nodules showed an opposite behaviour. In addition, molten metal experienced a superior fluidity in coated moulds. Moreover, the TWDI samples achieved a significant improvement in the value of hardness.